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LEE, SIU M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/791,527	Applicant(s) SAEY, DIMITRI	
	Examiner SIU M. LEE	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7,8,14,15,19,20,26 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7,8,14,15,19,20,26 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 7-8, 14-15, 19-20, 26, and 29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 7, 15, 19, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. (US 2001/0012783 A1) in view of Bolinth (PCT/DE2001/001622, published on 11/7/2002) (the examiner is using the national stage of this PCT application Bolinth et al. (US 7,460,465 B2) as a translation of this PCT application) and Ginesi et al. (US 2003/0054852 A1).

(1) Regarding claim 1:

Peeters discloses a modem, comprising:

a carriergroup receiving means (BiGi PROD in figure 1) configured to receive signal to noise ratio (SNR) relating to a plurality of carriers (the channel analyzing circuitry CHANNEL upon transmission of a predetermined sequence measures the

signal to noise ratio for each carrier , these signal to noise ratio values are used by the constellation information producer BiGi PROD to determine for each carrier subset the number of bits that can be modulated on each carrier, paragraph 0019; therefore, the BiGi PROD receives the signal to noise ratio of each carrier from CHANNEL); and

a carriergroup transmitting means (BiGi_TX of RX modem in figure 1) configured to transmit at least one message including the carriergroup bitloading and gain parameters for each of the plurality of dynamically variable size carrier groups (third embodiment as describe in paragraph 0023 discloses the carriergrouping method may be applied at initialization and alternatively may be applied during operation to adapt the carrier constellation according to changes of the channel characteristic, the examiner interpret this as adaptively and dynamically carriergrouping of carrier groups) (constellation information transmitting arrangement BiGi_TA transmit the constellation information message BiGi (bit allocation and gain) from the constellation information transmitter BiGi_TX (of modem RX) to the constellation information receiver BiGi_RX (of modem TX) as shown in figure 1, paragraph 0019).

Peeters does not explicitly disclose (a) a carriergrouping means configured to group the plurality of carriers into a plurality of dynamically variable size carrier groups based on the SNR parameters; (b) to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the

plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups; and (c) to determine gain parameters for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups.

With respect to (a), Peeters does not explicitly discloses a carriergrouping means configured to group the plurality of carriers into a plurality of dynamically variable size carrier groups based on the SNR parameters, however, Peeters further discloses in a third embodiment as describes in paragraph 0021 that the carriers are not a priori grouped in subsets, but rather after channel analysis (generating the signal to noise ratio for each carrier), the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to, the subsets of carriers typically will not contain the same number of carriers and the constitution of the subset will be reported via messages such as BiGi from the VDSL receiver to the VDSL transmitter and also in paragraph 0023, it describes the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. Therefore, it would have been obvious to one of ordinary skill in the art that the BiGi PROD also perform dynamically grouping of the carriers based on signal to noise ratio subjected the changes in the channel characteristics according to the third embodiment and provide the benefit of adaptation to changes of channel characteristic and prevent data lost.

With respect to (b), Peeters discloses the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to but fail to explicitly disclose to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups. However, in the same field of endeavor, Bolinth discloses reducing signaling overhead by allocating bit and performance distributions for subchannel groups or subcarrier groups and bit allocation can be based on the minimum SNR (worst case SNR) of the blocks or groups, so that an adequate bit error rate can be ensured as a result even for the poorest subcarrier in the group (column 7, lines 13-36, the examiner interprets the determination of the minimum SNR within each group as the claimed step of determining the worst case SNR for each of the plurality of dynamically variable size carrier groups and uses the worst case SNR to determine the bitloading for each of the plurality of carrier group).

It is desirable to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size

carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups because it ensure adequate bit error rate on the poorest subcarrier in the group (column 7, lines 31-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Bolinth in the modem of Peeters to use the minimum SNR in the carriergroup to determine the bit allocation for the carrier group to prevent data loss on the poorest subcarrier.

With respect to (c), Ginesi et al. discloses in paragraph 0043, equation 12, a relationship between gain factor A and the signal to noise ratio SNR, paragraph 0040 discloses once signal to noise ratio has been determined, a fine gain table can be compute based on the signal to noise ratio.

It is desirable to determining a second carriergroup parameter (gain for the carriergroup) is based on the first carriergroup parameter because it can reduce power consumption and interference (paragraph 0039). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ginesi et al. in the modem of Peeters and Bolinth in order to reduce interference and power consumption.

(2) Regarding claim 7:

Peeters discloses means (constellation determining circuitry BiGi_DET) for using at least one message to set up a tone encoder (MOD) in a far-end modem (TX modem) (the constellation information receiver BiGi_RX decapsulates the constellation information message and supplies the parameter values B1, G1, B2, G2, . . . , B8, G8 to

the constellation determining circuitry BiGi_DET; for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the constellation determining circuitry BiGi_DET obtain for each carrier the number of bits that should be modulated thereon. Similarly, the constellation determining circuitry BiGi_DET constantly interpolates for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the received gain value, G1, G2, . . . , G8 respectively, to obtain for each carrier the gain with which the carrier should be transmitted. The so generated bits and gains information is supplied to the control input of the DMT modulator MOD, paragraph 0019).

(3) Regarding claim 15:

Peeters discloses a method of grouping a plurality of carriers in a DMT communication system, the DMT communication system including a near end (TX modem in figure 1) and a far end modem (RX modem in figure 1), comprising:

determining at least one dynamically variable sized carrier group from the plurality of carriers used for communication in the DMT communication system (channel analyzing circuitry CHANNEL receives a predetermined sequence from the TX modem and measures the signal to noise ratio for each carrier, paragraph 0019, lines 4-7; paragraph 0021 states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter; this paragraph indicates that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio by CHANNEL as mentioned in paragraph 0019; paragraph 0023 states “the transmitting

and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics"; the carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This indicates that the generation of the constellation information (including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Since it is well known that the channel characteristic is dynamically changing, therefore, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that he grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier);

determining a carriergroup signal-to-noise ratio (SNR) for the plurality of carriers within at least one dynamically variable sized carrier group (the channel analyzing circuitry CHANNEL upon transmission of a predetermined sequence measures the signal-to-noise ratio (SNR) for each carrier f_0 to f_{4095}, paragraph 0019, lines 4-13);

determining a carriergroup bitloading and a carriergroup gain for the plurality of carriers within at least one dynamically variable sized carrier group based on the

carriergroup SNR (this signal-to-noise ratio values are used by the constellation information producer to determine for each carrier subset, SUBSET1 to SUBSET8 the number of bits that can be modulated on each carrier of this subset and the gain where each carrier of this subset should be transmitted with, paragraph 0019, lines 8-13);

using the carriergroup bitloading and the carriergroup gain to dynamically set up a tone encoder in the near end modem (MOD in figure 1) in the near end modem (the constellation information receiver BiGi_RX decapsulates the constellation information message and supplies the parameter values B1, G1, B2, G2, . . . , B8, G8 to the constellation determining circuitry BiGi_DET; for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the constellation determining circuitry BiGi_DET obtain for each carrier the number of bits that should be modulated thereon. Similarly, the constellation determining circuitry BiGi_DET constantly interpolates for each subset, SUBSET1, SUBSET2, ...SUBSET8, the received gain value, G1, G2,....,G8 respectively, to obtain for each carrier the gain with which the carrier should be transmitted. The so generated bits and gains information is supplied to the control input of the DMT modulator MOD, paragraph 0019); and

using the carriergroup bitloading and the carriergroup gain to transmit messages from the near end modem to the far end modem using the tone encoder (the MOD is being setup for modulates B1 bits (B1 is supposed to be 2 in Fig.) on the carriers f.sub.0 . . . f.sub.511 of SUBSET1 and transmits these carriers with gain G1, modulates B2 bits (B2 is supposed to be 4 in Fig.) on the carriers f.sub.512 . . . f.sub.1023 of SUBSET2 and transmits these carriers with gain G2, . . . , modulates B8 bits (B8 is supposed to be

3 in Fig.) on the carriers f.sub.3584 . . . f.sub.4095 of SUBSET8 and transmits these carriers with gain G8 as shown in figure 1, paragraph 0019).

Peeters fails to explicitly disclose (a) determining a worst case carriergroup signal to noise ratio for the plurality of carriers within the at least one dynamically variable sized carrier group and determining a carriergroup bitloading for the plurality of carriers within the at least one dynamically variable sized carrier group based on the worst case carriergroup SNR; and (b) based on the worst case carriergroup SNR to determine a carriergroup gain for the plurality of carriers within the at least one dynamically variable sized carrier group.

With respect to (a), Peeters discloses the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to but fail to explicitly disclose to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups. However, in the same field of endeavor, Bolinth discloses reducing signaling overhead by allocating bit and performance distributions for subchannel groups or subcarrier groups and bit allocation can be based on the minimum SNR (worst case SNR) of the blocks or groups, so that an adequate bit error rate can be ensured as a result even for the poorest subcarrier in the group

(column 7, lines 13-36, the examiner interprets the determination of the minimum SNR within each group as the claimed step of determining the worst case SNR for each of the plurality of dynamically variable size carrier groups and uses the worst case SNR to determine the bitloading for each of the plurality of carrier group).

It is desirable to determine the plurality of carriergroup parameters including a carriergroup signal to noise ratio (SNR) parameter being a worst case SNR parameter relating to the plurality of carriers within the dynamically variable size carrier groups and carriergroup bitloading parameters based upon the carriergroup SNR parameter for the plurality of dynamically variable size carrier group because it ensure adequate bit error rate on the poorest subcarrier in the group (column 7, lines 31-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Bolinth in the modem of Peeters to use the minimum SNR in the carriergroup to determine the bit allocation for the carrier group to prevent data loss on the poorest subcarrier.

With respect to (b), Ginesi et al. discloses in paragraph 0043, equation 12, a relationship between gain factor A and the signal to noise ratio SNR, paragraph 0040 discloses once signal to noise ratio has been determined, a fine gain table can be compute based on the signal to noise ratio. Therefore, using the minimum signal to noise ratio of the subcarrier group as taught by Bolinth, a corresponding gain for the subcarrier group can be determined

It is desirable to determining a second carriergroup parameter (gain for the carriergroup) is based on the first carriergroup parameter because it can reduce power

consumption and interference (paragraph 0039). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ginesi et al. in the modem of Peeters and Bolinth in order to reduce interference and power consumption.

(4) Regarding claim 19:

Peeters et al. discloses a method wherein the communication system is VDSL system (paragraph 0019, lines 1-2).

(5) Regarding claim 20:

Peeters discloses a modem, comprising:

a carriergroup receiving means (BiGi PROD in figure 1) configured to receive signal to noise ratio (SNR) relating to a plurality of carriers (the channel analyzing circuitry CHANNEL upon transmission of a predetermined sequence measures the signal to noise ratio for each carrier , these signal to noise ratio values are used by the constellation information producer BiGi PROD to determine for each carrier subset the number of bits that can be modulated on each carrier, paragraph 0019; therefore, the BiGi PROD receives the signal to noise ratio of each carrier from CHANNEL); and

a carriergroup transmitting means (BiGi_TX of RX modem in figure 1) configured to transmit message including each of the carriergroup bitloading and gain parameters to the far end modem via the transmission channel to enable the far end modem to send and receive message using the plurality of dynamically variable size carrier groups (third embodiment as describe in paragraph 0023 discloses the carriergrouping method may be applied at initialization and alternatively may be applied during operation to

adapt the carrier constellation according to changes of the channel characteristic, the examiner interpret this as adaptively and dynamically carriergrouping of carrier groups) (constellation information transmitting arrangement BiGi_TA transmit the constellation information message BiGi (bit allocation and gain) from the constellation information transmitter BiGi_TX (of modem RX) to the constellation information receiver BiGi_RX (of modem TX) as shown in figure 1, paragraph 0019, as it is well known in the art, the bit allocation and gain is being used for both transceiver, therefore, the far end modem uses the BiGi message for sending and receiving message).

Peeters does not explicitly disclose (a) a carriergrouping means configured to group the plurality of carriers into a plurality of dynamically variable size carrier groups based on the SNR parameters; (b) to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups; and (c) to determine gain parameters for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups.

With respect to (a), Peeters does not explicitly discloses a carriergrouping means configured to group the plurality of carriers into a plurality of dynamically variable size

carrier groups based on the SNR parameters, however, Peeters further discloses in a third embodiment as describes in paragraph 0021 that the carriers are not a priori grouped in subsets, but rather after channel analysis (generating the signal to noise ratio for each carrier), the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to, the subsets of carriers typically will not contain the same number of carriers and the constitution of the subset will be reported via messages such as BiGi from the VDSL receiver to the VDSL transmitter and also in paragraph 0023, it describes the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. Therefore, it would have been obvious to one of ordinary skill in the art that the BiGi PROD also perform dynamically grouping of the carriers based on signal to noise ratio subjected the changes in the channel characteristics according to the third embodiment and provide the benefit of adaptation to changes of channel characteristic and prevent data lost.

With respect to (b), Peeters discloses the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to but fail to explicitly disclose to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of

dynamically variable size carrier groups. However, in the same field of endeavor, Bolinth discloses reducing signaling overhead by allocating bit and performance distributions for subchannel groups or subcarrier groups and bit allocation can be based on the minimum SNR (worst case SNR) of the blocks or groups, so that an adequate bit error rate can be ensured as a result even for the poorest subcarrier in the group (column 7, lines 13-36, the examiner interprets the determination of the minimum SNR within each group as the claimed step of determining the worst case SNR for each of the plurality of dynamically variable size carrier groups and uses the worst case SNR to determine the bitloading for each of the plurality of carrier group).

It is desirable to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups because it ensure adequate bit error rate on the poorest subcarrier in the group (column 7, lines 31-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Bolinth in the modem of Peeters to use the minimum SNR in the carriergroup to determine the bit allocation for the carrier group to prevent data loss on the poorest subcarrier.

With respect to (c), Ginesi et al. discloses in paragraph 0043, equation 12, a relationship between gain factor A and the signal to noise ratio SNR, paragraph 0040 discloses once signal to noise ratio has been determined, a fine gain table can be compute based on the signal to noise ratio.

It is desirable to determining a second carriergroup parameter (gain for the carriergroup) is based on the first carriergroup parameter because it can reduce power consumption and interference (paragraph 0039). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ginesi et al. in the modem of Peeters and Bolinth in order to reduce interference and power consumption.

(6) Regarding claim 26:

Peeters discloses means (constellation determining circuitry BiGi_DET) for using at least one message to set up a tone encoder (MOD) in a far-end modem (TX modem) (the constellation information receiver BiGi_RX decapsulates the constellation information message and supplies the parameter values B1, G1, B2, G2, . . . , B8, G8 to the constellation determining circuitry BiGi_DET; for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the constellation determining circuitry BiGi_DET obtain for each carrier the number of bits that should be modulated thereon. Similarly, the constellation determining circuitry BiGi_DET constantly interpolates for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the received gain value, G1, G2, . . . , G8 respectively, to obtain for each carrier the gain with which the carrier should be

transmitted. The so generated bits and gains information is supplied to the control input of the DMT modulator MOD, paragraph 0019).

4. Claims 8, 14 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. (US 2001/0012783 A1) in view of Bolinth (PCT/DE2001/001622, published on 11/7/2002) (the examiner is using the national stage of this PCT application Bolinth et al. (US 7,460,465 B2) as a translation of this PCT application), Ginesi et al. (US 2003/0054852 A1) and Tzannes (US 6,961,369 B1)

(1) Regarding claim 8:

Peeters discloses a method for grouping a plurality of carriers in a DMT communication system, comprising

grouping the plurality of carriers used for communication in the DMT communication system into a plurality of dynamically variable size carrier groups (paragraph 0021 disclose that the carriers are not a priori grouped in subsets, but rather after channel analysis (generating the signal to noise ratio for each carrier), the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to, the subsets of carriers typically will not contain the same number of carriers and the constitution of the subset will be reported via messages such as BiGi from the VDSL receiver to the VDSL transmitter and paragraph 0023 discloses transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. It is well known in the art that a channel characteristic is always

changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From paragraph 0021 and 0023, it is inherent that the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier);

determining a plurality of carriergroup parameters for each of the plurality of dynamically variable sized carrier groups (CHANNEL and BiGi_PROD determine the carriergroup information that includes at least the number of bit for each carrier subset, and the gain for each carrier subset based on the signal to noise ratio generated by the CHANNEL, paragraph 0019, and paragraph 0021 discloses the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to); and

sending at least one message, the at least one message including the plurality of carriergroup parameters (constellation information transmitting arrangement BiGi_TA transmit the constellation information message BiGi from the constellation information transmitter BiGi_TX (of modem RX) to the constellation information receiver BiGi_RX (of modem TX) as shown in figure 1, paragraph 0018-0019).

Peeters fails to disclose (a) the plurality of carriergroup parameters including a carriergroup signal to noise ratio (SNR) parameter being a worst case SNR parameter relating to the plurality of carriers within the dynamically variable size carrier groups and carriergroup bitloading parameters based upon the carriergroup SNR parameter for the plurality of dynamically variable size carrier group; (b) gain parameters based upon the

carriergroup SNR parameter for the plurality of dynamically variable size carrier group; and (c) using the plurality of carriergroup parameter to dynamically set up a tone encoder.

With respect to (a), Peeters discloses the carrier are grouped in subsets of carriers where the same amount of bits will be allocated to but fail to explicitly disclose to determine a carriergroup SNR parameter for each of the plurality of dynamically variable size carrier groups, the carriergroup SNR parameter being a worst case parameter from among the SNR parameters corresponding to the plurality of carriers within each of the plurality of dynamically variable size carrier groups, and to determine carriergroup bitloading for each of the plurality of dynamically variable size carrier groups based upon the worst case SNR parameter for each of the plurality of dynamically variable size carrier groups. However, in the same field of endeavor, Bolinth discloses reducing signaling overhead by allocating bit and performance distributions for subchannel groups or subcarrier groups and bit allocation can be based on the minimum SNR (worst case SNR) of the blocks or groups, so that an adequate bit error rate can be ensured as a result even for the poorest subcarrier in the group (column 7, lines 13-36, the examiner interprets the determination of the minimum SNR within each group as the claimed step of determining the worst case SNR for each of the plurality of dynamically variable size carrier groups and uses the worst case SNR to determine the bitloading for each of the plurality of carrier group).

It is desirable to determine the plurality of carriergroup parameters including a carriergroup signal to noise ratio (SNR) parameter being a worst case SNR parameter

relating to the plurality of carriers within the dynamically variable size carrier groups and carriergroup bitloading parameters based upon the carriergroup SNR parameter for the plurality of dynamically variable size carrier group because it ensure adequate bit error rate on the poorest subcarrier in the group (column 7, lines 31-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Bolinth in the modem of Peeters to use the minimum SNR in the carriergroup to determine the bit allocation for the carrier group to prevent data loss on the poorest subcarrier.

With respect to (b), Ginesi et al. discloses in paragraph 0043, equation 12, a relationship between gain factor A and the signal to noise ratio SNR, paragraph 0040 discloses once signal to noise ratio has been determined, a fine gain table can be compute based on the signal to noise ratio.

It is desirable to determining a second carriergroup parameter (gain for the carriergroup) is based on the first carriergroup parameter because it can reduce power consumption and interference (paragraph 0039). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ginesi et al. in the modem of Peeters and Bolinth in order to reduce interference and power consumption.

With respect to (c), Peeters discloses constellation information transmitting arrangement BiGi_TA transmit the constellation information message BiGi from the constellation information transmitter BiGi_TX (of modem RX) to the constellation information receiver BiGi_RX (of modem TX) as shown in figure 1, but fails to explicitly

discloses using the BiGi_TX comprises a tone encoder that uses plurality of carriergroup parameters for dynamically set up a tone encoder. However, Tzannes discloses a transceiver that uses bit allocation table (BAT) 44 to communicate with QAM encoder 42 (tone encoder) to specify the number of bits carries by each carrier signal.

It is desirable to use the plurality of carriergroup parameter to dynamically set up a tone encoder because it provides adaptation to the channel characteristics and as a result prevention of data lost and full utilize the channel bandwidth or throughput. Therefor, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Tzannes in the method of Peeters, Bolinth and Ginesi to prevent data lost and fully utilize the channel bandwidth.

(2) Regarding claim 14:

Peeters discloses means (constellation determining circuitry BiGi_DET) for using at least one message to set up a tone encoder (MOD) in a far-end modem (TX modem) (the constellation information receiver BiGi_RX decapsulates the constellation information message and supplies the parameter values B1, G1, B2, G2, . . . , B8, G8 to the constellation determining circuitry BiGi_DET; for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the constellation determining circuitry BiGi_DET obtain for each carrier the number of bits that should be modulated thereon. Similarly, the constellation determining circuitry BiGi_DET constantly interpolates for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the received gain value, G1, G2, . . . , G8 respectively, to obtain for each carrier the gain with which the carrier should be

transmitted. The so generated bits and gains information is supplied to the control input of the DMT modulator MOD, paragraph 0019).

(3) Regarding claim 29 (the examiner interprets the claimed tone encoder as a tone encoder in a far end modem):

Peeters discloses means (constellation determining circuitry BiGi_DET) for using at least one message to set up a tone encoder (MOD) in a far-end modem (TX modem) (the constellation information receiver BiGi_RX decapsulates the constellation information message and supplies the parameter values B1, G1, B2, G2, . . . , B8, G8 to the constellation determining circuitry BiGi_DET; for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the constellation determining circuitry BiGi_DET obtain for each carrier the number of bits that should be modulated thereon. Similarly, the constellation determining circuitry BiGi_DET constantly interpolates for each subset, SUBSET1, SUBSET2, . . . , SUBSET8, the received gain value, G1, G2, . . . , G8 respectively, to obtain for each carrier the gain with which the carrier should be transmitted. The so generated bits and gains information is supplied to the control input of the DMT modulator MOD, paragraph 0019).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Siu M Lee/
Examiner, Art Unit 2611
12/27/2010